

Spring 2009

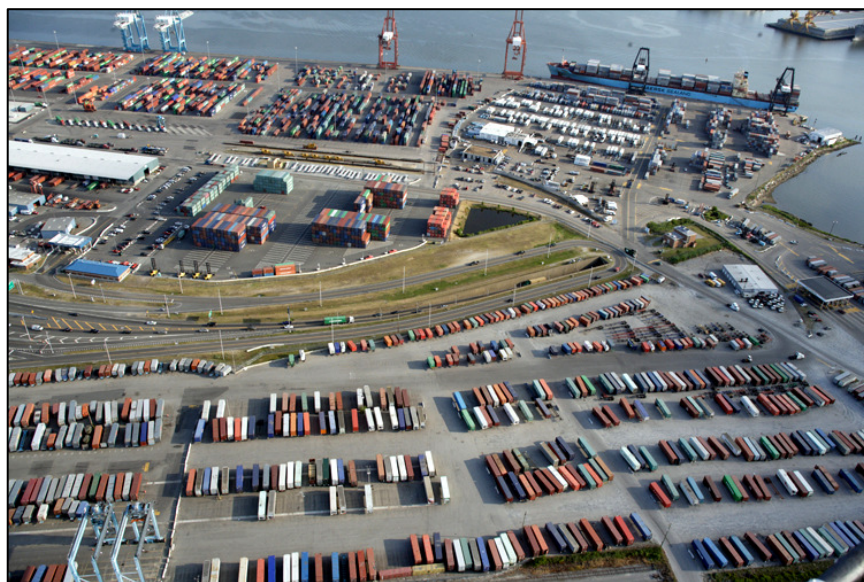
# VTM Connection

Virginia's Transportation Modeling Newsletter

## Hampton Roads Truck Model Development

By Jeremy Raw, P.E., AICP

The VDOT Travel Demand Modeling Group is approaching completion of a new truck model component for the Hampton Roads regional travel demand model. The new model was motivated by a desire to represent the movement of heavy trucks across and within the region, and to model growth in truck traffic due both to long distance commodity movements through the region, and to regional economic growth.



Aerial photo of Midtown Tunnel from the Portsmouth side

The results of this model will be very useful in planning for future transportation needs. According to the Hampton Roads MPO's Intermodal Management System Regional Freight Report (2007), the ports in Hampton Roads are collectively the sixth largest in the United States and the third largest on the East Coast of the United States. Freight carried by trucks in the region is forecast to increase by 80% over the next 20 years. A major new port at Craney Island is also under development, and the new model will help visualize traffic generated by that facility.

### VDOT TRAVEL MODELING CONTACTS

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### KEY TRAVEL MODELING WEBSITES

#### ➤ Virginia Travel Modeling Program

<http://www.virginiadot.org/vtm>

#### ➤ Hampton Roads PDC Travel Modeling

[http://www.hrmpo.org/MPO\\_TravelDemand.asp](http://www.hrmpo.org/MPO_TravelDemand.asp)

#### ➤ Metropolitan Washington COG Travel Modeling

<http://www.mwcog.org/transportation/activities/models/>

#### ➤ FHWA Travel Model Improvement Program (TMIP)

<http://tmip.fhwa.dot.gov/>

DAVID J-H. LEE, PHD-ABD  
Senior Regional Planner, GWRC/FAMPO



David is from a beautiful costal city which is called Kangnung (Gangneung) in Kangwon (Gangwon) Province in South Korea.



David attended Hanyang University in Seoul where he earned his undergraduate degree in the City Planning and Design Program with a specialization in Urban Design. In 1999, David moved to Buffalo, NY where he earned a master’s degree from the State University of New York (SUNY)’s Urban Planning Program in 2001 with a specialization in GIS. In 2002, David decided to pursue a PHD in City and Regional Planning from The Ohio State University and completed his coursework with a specialization in urban modeling in 2006. David has a passion for integrating land use and transportation planning and would like to someday develop a fully integrated landuse-transportation urban model.

see VTM SPOTLIGHT. page 3

Developing the truck model has focused on creating several new truck trip purposes. Within regional travel models, a “trip purpose” describes a class of vehicle trips that have the same operating characteristics, such as trips from home to work or trips from home to non-work locations. Trips made for the same purpose go to similar places, travel similar distances, and take place at similar times. The existing Hampton Roads model treats truck trips as a portion of generic “non-home-based” trips. The new model constructs specific purposes for truck trips, based on data collected about actual truck movements. As a result, it allows much more precise forecasts of future truck activity.

While the current model’s estimates of overall vehicle trips match up quite well with actual regional traffic, truck trips associated with freight movements cannot currently be distinguished within the model from trips by smaller service or delivery vehicles, or even from trips that are taken in personal vehicles from one non-home location to another. Because the factors that influence future growth of truck trips are likely not to be the same as these other kinds of non-home-based trips, future forecasts made by the existing model cannot clearly identify anticipated increases or decreases in truck traffic.

The model development process started with separating two classes of truck trips from other non-home-based trips based on the type of information that can most reliably estimate how many truck trips will occur. The first class consists of trucks associated with freight movements through port facilities and major warehouses and distribution centers. This new freight model will associate the volume of trucks with the volume of commodities moved through these facilities, and future forecasts can be based on anticipated growth in port activity. Many of these trips link the ports to distribution centers and locations outside the Hampton Roads area. In reality, movement of freight from the ports can serve markets inside the Hampton Roads as well as markets outside the area. Consequently, the port truck trip purpose has been further divided into trips that are focused on long distance freight movements (from the port to destinations outside the region, either directly from the port or through distribution centers and warehouses), and trips that are taking freight to markets within the Hampton Roads metropolitan area. The second class of truck trips are truck movements that are generated as a result of economic activity and that do not involve freight movement through large facilities. These truck trips are referred to in the new truck model as “non-port truck trips”. Since these trips are always associated with markets within the Hampton Roads region, the estimated number of this type of truck trip is based on the size of the market in the region, as described through the same socio-economic forecasts that are used to predict future growth in traffic other than trucks. In order to make this part of the new model work, both the number of truck trips and the number of all the other non-home-based trips had to be adjusted in order to keep the overall traffic volumes consistent with what is actually observed in the region. As with the port trucks, this class of trucks represents two sub-classes of trips – trucks traveling from one location to another within the region, and trucks traveling in and out of the region from other areas (external trips).

The Hampton Roads model ends up with four new trip purposes as shown in the table. In addition, the existing non-home-based trip purpose was adjusted to leave out truck estimates since those are handled by the new trip purposes.

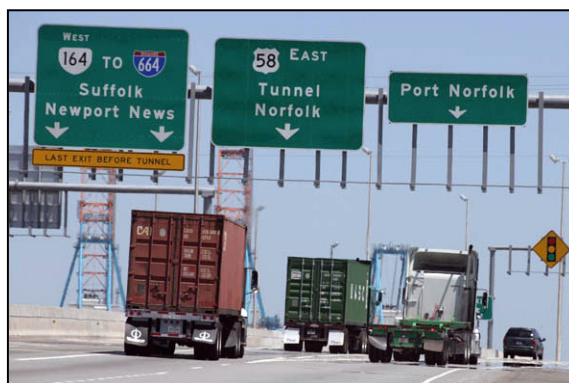
Trip Purpose Name	Truck Source	Truck Market
External Port Trucks	Ports (Commodity Flow)	External
Internal Port Trucks	Ports (Commodity Flow)	Hampton Roads
External Non-Port Trucks	Hampton Roads	External
Internal Non-Port Trucks	Hampton Roads	Hampton Roads

NEWS BRIEFS

- Upcoming training and conferences of Interest:
  - VTM hosts CUBE modeling software training in VCU from May 11 noon to May 15 noon.
  - The 12th TRB National Transportation Planning Applications Conference will be held in Houston, Texas on May 17-21, 2009.



The other major step in the model development was to construct a modeled truck network describing the routes that trucks use in the area. That network was developed by starting with the basic highway system in Hampton Roads, applying truck restrictions such as exist on Hampton Boulevard, and finally limiting certain roads based on survey data indicating that those roads are not commonly used by truck traffic. By identifying the truck network in this way, the model has the ability to examine the effect of truck restrictions and opening new truck routes on truck and traffic volumes across the region.



**Truck traffic northbound along Rt 58 in Portsmouth.**

Developing the new truck model has been a collaborative effort. VDOT has used traffic counts and new survey data collected by the agency, as well as information on truck and freight activity generously supplied by the Hampton Roads Metropolitan Planning Organization, the Virginia Port Authority and by A.P. Moeller, which operates the new Maersk terminal in Portsmouth. The model development team has consulted with each of these agencies in order to understand the characteristics of freight traffic in the region, as well as how to create a model that will be useful in their future planning analyses. Though much of the model development work has been performed by VDOT staff, important help in developing new trip rates and trip tables has been provided through a consulting arrangement with Kimley-Horn Associates.

## National Household Travel Survey Effort Wrapping Up in Virginia and Nationwide

The National Household Travel Survey (NHTS) effort began in Virginia and nationwide in April, 2008 and will continue through mid-May, 2009. The purpose of the NHTS survey is to provide trends on America's daily travel behavior. NHTS captures both daily and seasonal variation as well as long distance travel. The NHTS is conducted every 5 to 8 years by the Federal Highway Administration (FHWA) with past surveys occurring in 1969, 1977, 1983, 1990, 1995, and 2001. NHTS is the United States' flagship travel survey and serves as the nation's inventory of daily and long-distance travel. The survey has provided the nation with authoritative data on travel by all modes of transportation, for all travel purposes, and all travel distances. The NHTS series provide vital data on American passenger travel and can be used to examine the relationship among social and demographic change, land development patterns, and transportation. The series is an essential tool for those seriously interested in understanding travel behavior and transportation planning issues.

The NHTS data is intended to address a number of issues in transportation, ranging in scope from the impacts of gas tax changes to trip generation rates needed to calibrate travel demand models. Along the way there are a number of issues that relate to how we, as a nation, are evolving - the changing roles of women and men within the family structure, the growth and increased mobility of the older driver population, the continued increase in vehicle ownership, and the

## VTM SPOTLIGHT *(continued)*

He is currently working on his dissertation in land use modeling and is teaching an advanced Geography class at the University of Mary Washington as an adjunct faculty member.

David took a position as a senior regional planner with the George Washington Regional Commission (GWRC) in 2006 which provides the staff for the Fredericksburg MPO (FAMPO). In this capacity, David leads the MPO's travel demand modeling and land use modeling efforts, uses the regional model for MPO model applications such as the constrained long range transportation plan (LRTP), and recently developed a land use model called CUSIM-M which was used to integrate land use forecasting with travel demand modeling for the recent FAMPO 2035 LRTP effort. David also represents the GWRC at the Virginia Transportation Modeling (VTM) User's Group and has given several presentations to the VTM as well as other professional organizations and venues such as the NC RTPB TFS, and the 54th Annual North American Meetings of the Regional Science Association International in 2007.

David's hobbies include traveling, driving, cooking, blogging, and studying history and culture, particularly Korean traditional culture. David recently took advantage of low mortgage rates and bought a house in Spotsylvania County where he now lives and enjoys a Virginian life style with his two year old Jack Russell Terrier named Marron.

## NEWS BRIEFS *(continued)*

- The 2009 Virginia GIS Conference will be held in Richmond, VA from September 21 to 23. Presentation abstract submission is due by Friday, June 5, 2009. Please go to <http://www.virginiagis.org/> for more details.

continued decentralization of our metropolitan areas.

The need for sound, reliable data on the travel of the American public could not be greater. We are facing issues of the “working retirement” of the first wave of baby boomers, continued congestion on our nations streets and highways, unmet mobility needs of older Americans, greater flexibility in working arrangements, a crisis in teen driving safety, and a host of other concerns.

The 1969, 1977, 1983, and 1990 survey efforts did not allow public agencies to Add-On to the national sample, but in the 1995 survey effort, this option was made available for the first time. This option became the NHTS Add-On program in 2001 and was greatly expanded with over 44,000 surveys conducted. For the current 2008-2009 NHTS effort, the Add-On program has again significantly expanded with over 125,000 surveys planned in twenty areas. With the addition of about 25,000 national samples being conducted, the entire NHTS effort will collect over 150,000 samples nationwide.

In Virginia, about 15,000 total household surveys are being conducted: 14,342 from the statewide Add-On and about 650 from the national NHTS sample. As of 4/20/09, over 95% of Virginia samples had been completed. The Virginia effort focuses primarily on metropolitan planning organizations (MPOs) within Virginia, but will also do some rural sampling for statewide planning purposes. The survey data collected from this effort will provide planners across Virginia with a rich data source to support a variety of transportation planning applications. Data from this survey effort will be processed and geocoded starting in June, 2009 and continuing through early 2010. NHTS data should be available for analysis and research by Spring, 2010.

For more information about NHTS, please visit:

Official NHTS website: <http://nhts.ornl.gov/>

FHWA's NHTS website: <http://www.fhwa.dot.gov/policy/ohpi/nhts/index.htm>

NHTS FAQs website: <http://www.fhwa.dot.gov/policy/ohpi/nhts/nhtsspinfo.htm>

## 2009 VTM CUBE Voyager Training Coming Up In Richmond

VDOT is providing 2009 VTM CUBE Voyager training in Richmond, VA from May 11 to 15th at Virginia Commonwealth University (VCU)'s Monroe Park campus. The training will be conducted using Citilabs' new CUBE 5.0 software which is integrated with ESRI's ArcGIS software and will be hands on using the VTM Charlottesville training model. The training will be divided into two parts covering four days. The first two days will cover CUBE Basics and the last two days will cover advanced CUBE Voyager aspects including scripting. The training instructors will be Ken Kaltenbach from the Corradino Group and Wade White from the Whitehouse Group. The training is open to Virginia DOT and MPO transportation planning staff. For more information, please contact Ju-Yin Chen at [ju-yin.chen@vdot.virginia.gov](mailto:ju-yin.chen@vdot.virginia.gov).

## Highlights of Virginia Travel Demand Modeling Activities

No.	District/MPO Area	Contact(s)	Current/Recent News
1	Danville	Jaesup Lee	New CUBE Catalog model was developed to be consistent with VTM guidelines and is being used for CLRP.
2	Fredericksburg	Nelson Newton Juyin Chen	- New CUBE Catalog Version 3.0 completed which includes HOT lane capability. - Model has been used for several projects and studies including 2035 CLRP air quality conformity analysis
3	Hampton Roads	Jeremy Raw Andy Pickard	- Geocoding 2008 employment data to get current socioeconomic data by TAZModel - Preparing estimates of 2034 congestion
4	Harrisonburg	Paul Agnello	Model improvement is completed.
5	NOVA	Bill Mann Barham Jamei	- Number of TAZs increases from 2,192 to 4,000 and land activity is being updated for 2040. - Data of the 2007 Metrorail survey, 2007/08 HH travel survey and 2008 regional bus survey is being cleaned up by MWCOG/TPB
6	Roanoke	Nelson Newton	New CUBE Catalog model is being developed for the 2035 CLRP.
7	Winchester	Juyin Chen	Model improvement is completed.